

British Medical Association

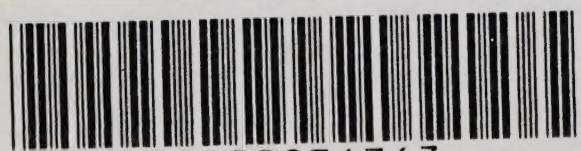
REPORT OF COMMITTEE
ON
NUTRITION

"To determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets."

LONDON:

PRINTED AT THE OFFICE OF THE BRITISH MEDICAL ASSOCIATION,
TAVISTOCK SQUARE, W.C.1

1933



22500876763

British Medical Association

REPORT OF COMMITTEE
ON
NUTRITION

*Reprinted from the SUPPLEMENT to the BRITISH MEDICAL JOURNAL,
November 25th, 1933*

LONDON:

PRINTED AT THE OFFICE OF THE BRITISH MEDICAL ASSOCIATION,
TAVISTOCK SQUARE, W.C.1

1933

WELLCOME INSTITUTE LIBRARY	
Coll.	weIMOmec
Coll.	pam
No.	QU 146
	• BE 5
	1933
	B 86 r

WELLCOME

WELLCOME INSTITUTE LIBRARY

Report of Committee on Nutrition

PRELIMINARY

The Committee was appointed by the Council on April 12th, 1933, with the following reference :

“ To determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets.”

The Committee consisted of :

- E. K. LE FLEMING, M.D., Wimborne (Chairman of Representative Body (*Chairman*)).
- G. C. M. M'GONIGLE, M.D., Medical Officer of Health, Stockton-on-Tees, *Honorary Secretary*.
- Sir HENRY BRACKENBURY, M.D., LL.D., London (Chairman of Council).
- N. BISHOP HARMAN, F.R.C.S., LL.D., London (Treasurer).
- G. F. BUCHAN, M.D., F.R.C.P., Medical Officer of Health and School Medical Officer, Willesden.
- S. J. COWELL, M.A., M.B., B.Ch., M.R.C.P., Professor of Dietetics, University of London.
- G. E. FRIEND, M.A., M.R.C.S., L.R.C.P., Medical Officer, Christ's Hospital, Horsham.
- ROBERT HUTCHISON, M.D., F.R.C.P., Physician, London Hospital.
- V. H. MOTTRAM, M.A., Professor of Physiology, University of London.

The Committee is greatly indebted to the following for advice and assistance given at the deliberations of the Committee:

- A. L. BOWLEY, Sc.D., F.B.A., F.S.S., Professor of Statistics, University of London.

G. P. CROWDEN, M.Sc., M.R.C.S., L.R.C.P., Department of Industrial Physiology, London School of Hygiene and Tropical Medicine.

The Committee desires also to thank the medical officers of health for Bootle, Cardiff, Heston and Isleworth, Newcastle-on-Tyne, Oxfordshire, Oxford City, and Swindon, for their assistance in collecting food prices and family budgets, Miss M. L. Clark, L.L.A., for assistance in checking statistics, and Mr. John Kirby, M.R.S.I., Sanitary Inspector, Stockton-on-Tees, for his skill and energy in the collection and tabulation of data.

INTRODUCTORY REMARKS

The subject of human nutrition has during recent years received, from physicians and laymen alike, a vast amount of attention. There are several reasons for the increased and world-wide interest in this important matter. During the war of 1914-18 the availability and adequacy of food supplies became a matter of urgency to each combatant nation. In Great Britain, everyone during that period of controlled production, importation, and distribution, including rationing of food, took a personal and intense interest in the provision of family food. The present public interest in nutrition may be said to date from the war period, but has been accentuated by the economic depression.

The dislocation of ordinary trade transactions by war caused, in certain countries, a serious shortage of some essential foodstuffs, and this shortage was responsible for a high incidence of pathological states peculiar to a condition of malnutrition. This state of affairs served to focus attention upon diet and nutrition, and the interaction of these factors with health and disease, and it stimulated a vast amount of research work on the subject.

Realization by the British public of the importance of satisfactory nutrition has recently given rise to anxiety as to whether, in the present state of trade depression, the unemployed and the poorer-paid workers are in fact suffering from malnutrition; and as to whether, if such is the case, the purchasing power of these individuals is sufficient to procure adequate food for themselves and their families. Divergent expres-

sions of opinion on these and associated matters have appeared in the Press. There is on the one hand a considerable body of opinion that malnutrition is not observable among the poor, and on the other hand that it exists to a considerable extent.

The Council of the British Medical Association, realizing the national importance of nutrition as a factor in the health of the population, set up a special committee with the following terms of reference:

“ To determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets.”

Though the terms of reference appear to be, from their very conciseness, extremely simple and capable of facile discharge, a number of interconnected problems involved are of a complex nature. It was no part of the Committee's duty to determine whether malnutrition is widespread or not among any section of the community, yet a knowledge of the actual facts would have been extremely useful. The Committee desires to express the opinion that knowledge of the extent, or absence, of malnutrition among varied social groups would, if considered in conjunction with data as to the food intake of those groups, prove of great value and public interest.

The Committee further desires to place on record its regret that there exists no satisfactory and accepted routine method by which the nutritional condition or state of individuals can be assessed, and by which the findings of different observers can be compared. The absence of a satisfactory standard of “ normal nutrition ” is probably the explanation why so many divergent opinions are expressed as to the nutritional condition of, for example, elementary school children. The usually adopted age, height, and weight ratios are open to serious objections when applied to individuals. The functional fitness of the individual needs to be studied as well as the anthropometric measurements if the true state of nutrition is to be correctly appraised.

PRELIMINARY DATA

Before any attempt could be made to assess the actual cost of a diet “ adequate to maintain health

and working capacity," it was necessary to define the nature of the various essential constituents of a diet which would fulfil the requirements, and, further, to agree upon the quantities necessary at varying ages.

Man-Values

It is obvious that a man requires a greater quantity of food per day than a child of, say, 5 years of age. The difficulty lies in determining the ratio between growing children of various ages and that of an adult male. It must be realized that any figures agreed upon can only be in the nature of approximations, and must be considered as generalizations for any particular age. The variations that exist between human beings of equal ages cannot be covered by any fixed scale of values ; and, moreover, in the case of adults, the nature of the occupation profoundly influences the individual's need for calories.

In the case of an adult male large variations of food intake occur according to his size and muscular output. It is obvious that a man 5 feet in height, weighing 9 stone, and employed in the sedentary occupation of clerking, can maintain his health and working capacity on a lower food intake than is necessary for a man 6 feet in height, weighing 14 stone, who works as a navvy. We are therefore faced with the initial difficulty of assessing food intake of a "normal" adult male. Many scales which have been drawn up, and they are numerous, take the adult male doing moderate muscular work as the unit with which other individuals are compared ; but, as shown above, it is difficult to determine what is the "normal" man. When making calculations for any one individual, or family, these difficulties must be taken into account and allowances made for gross variations from the normal average man. The "normal" adult male of average stature is taken as unity in scales which purport to show the "man-value" of individuals of various ages.

Measure of Energy Value of Foods: Calories

The energy value of a food is commonly expressed as the number of "calories" yielded by each gram of the food. (A food calorie, or kilocalorie, is the

amount of heat required to raise 1 kilogram of water 1° C., this being the unit of measurement adopted in nutritional studies.) The calorie value of food varies with its nature. Thus 1 gram of protein yields 4.1 calories, and 1 gram of fat 9.3, while 1 gram of carbohydrate gives the same number of calories as an equivalent weight of protein—namely, 4.1. By means of these figures it is possible to assess the energy value, or calories, of a diet composed of various foodstuffs. Appendix A of this report sets out the proportions of protein, fat, and carbohydrate in some of the foods in common use. The figures are taken from Professor R. H. A. Plimmer's book, *Analyses and Energy Values of Foods*, which should be consulted for the composition of foods not given in the short list in Appendix A.

Daily Requirements in Calories

Calculations made by various workers differ somewhat as to the total number of calories required daily by the adult male of average stature, but the figure has been assessed at 3,000. This figure refers to the calorie value of the foodstuffs as purchased. The figure of 3,000 is an approximate mean, but objection may be raised to it on the grounds that (a) it makes no allowance for waste ; (b) this figure, though the mean of many observations and calculations, and though a probable approximation to the mean amount commonly obtained, is not necessarily the optimal quantity ; and (c) that it is probably lower than the amount the average healthy and active man would instinctively take, for many of the data used in its calculation were collected from unskilled, poorly paid, and unemployed families during times of industrial depression. From consideration of available information it appears that a 3,000 calorie gross supply—that is, of food as purchased—per man per day is adequate to maintain health and body weight of the average man, provided that his energy output is trifling in amount—in other words, provided that he is leading a life of comparative idleness. It is doubtful whether 3,000 calories in the food as purchased are sufficient to maintain "working capacity" if the work entails any considerable amount of muscular exertion. It is on record that, during the

course of studies on the dietaries and working capacity of prisoners in Scotland, 3,700 calories per day were required to enable prisoners doing moderately hard work to maintain health, weight, and working capacity.

It may be argued that an unemployed man can keep healthy upon a daily gross supply of 3,000 calories in the food. This may be so, but there exists some doubt as to whether he can maintain working capacity on this allowance. Consideration of the facts which are known points to the conclusion that the requisite daily number of calories per "normal" adult male not performing strenuous manual labour lies somewhere between 3,000 and 3,700. As it is necessary for the purpose of calculations to assume a definite figure, the Committee is of the opinion that 3,400 calories in the food as purchased is a safe figure for the daily requirement of a man of average stature leading a healthy life with moderate muscular exertion. Allowing for wastage in preparation and digestion, this figure of 3,400 calories in food as purchased should assure 3,000 available calories. This figure is not a minimum, nor, on the other hand, is it set up as the optimal requirement. Nevertheless, it is, in the opinion of the Committee, a reasonably safe figure to adopt, for it is sufficiently generous to permit working capacity to be maintained if the work is not of a really strenuous nature. This figure is slightly lower than that of the "standard ration" of Army troops at home stations (1933). It must be remembered that the standard Army ration is usually supplemented from various sources. It is considerably lower than the standard ration supplied to Territorial soldiers during their Army training season.

The slightly higher allowance of calories has little influence on the cost, as calories derived from carbohydrates can be purchased very cheaply.

"Man-Value" of Women and Children

It is obvious that a child requires fewer calories per day than a man, and that the quantity requisite will vary according to the age of the child. Many different scales have been drawn up to show the calories necessary at different ages, these being usually expressed as fractional values of the requirements of the

adult male—namely, man-value unit. The scale drawn up by Cathcart and Murray is usually adopted in this country.

An international scale was set up at a conference of representatives from various countries in October, 1932. The chairman of that conference admitted that the scale adopted was a compromise, and might need modification to suit individual countries ; but it was intended for use in comparative studies and not for rigid application. This scale is unsuitable for Great Britain, and for this reason the Committee has decided not to use it.

The determination of the fraction of unity calories required by a child is not just a matter of multiplying the number of pounds of its body weight by a fixed number of calories, for, though an adult requires about 20 calories per day per pound of body weight, a young infant requires 50 calories per day per pound of body weight. In the case of a growing child the food intake must be sufficient to provide for growth as well as for energy expenditure, the repair of tissue waste, the maintenance of temperature, etc. The fraction of unity which represents a child's daily calorie requirement is known as its equivalent "man-value." Cathcart and Murray's table of man-values is as shown in Table I.

From this table it is easy to calculate the total "man-value" of a family. An example will make this clear. A family consisting of husband, wife, and four children, aged 13, 10, 7, and 4 years, has a total man-value of 4.63—namely, the sum of 1, 0.83, 0.9, 0.8, 0.6, and 0.5. Therefore the family requires 4.63 man rations of calories per day.

The calorie figures given in the above table are somewhat higher than the minimum values represented by 3,000 calories per adult male, as, for reasons stated previously, 3,400 calories is a quantity which allows some factor of safety, takes due account of waste, and is nearer the unknown optimal figure than is 3,000. It may be pointed out that a scale based on the lower figure, 3,000 calories in the food as purchased, or 2,700 calories allowing for wastage, would undoubtedly prove inadequate for a large number of healthy, active individuals of good physique, and whose fitness and capacity for work it is of vital importance for the nation to ensure.

TABLE I.—*Man-values at Ages (Cathcart and Murray)*

Ages	Man-value	Calories*
Adult male	1.00	3,400
„ female... ..	0.83	2,840
Child 1 and under 2 years ...	0.30	1,020
„ 2 „ 3 „ ...	0.40	1,360
„ 3 „ 6 „ ...	0.50	1,700
„ 6 „ 8 „ ...	0.60	2,040
„ 8 „ 10 „ ...	0.70	2,380
„ 10 „ 12 „ ...	0.80	2,720
„ 12 „ 14 „ ...	0.90	3,060
Old person (65 +)	0.75	2,550

* The calorie equivalents of the various “man-values” are inserted here for the sake of convenience. The figures in this column depend, of course, upon the number of calories taken as the standard man-value requirement—in this case 3,400 in the food as purchased.

Note.—The figures in the last column of Table I refer to the quantities of calories required at various ages. For reasons which are subsequently given (pp. 39-41) the relative cost of these numbers of calories is not, at all ages, directly proportional to their numbers.

This divergence from the figure of 3,000 may be criticized, but the Committee feels strongly that the words “and maintain working capacity” in its terms of reference justify the adoption of a slightly more generous quantity than a bare subsistence intake. It cannot be assumed that the working man’s wife leads a sedentary existence during the time her husband is out of work, and common knowledge tells us that her existence calls for the output of a very considerable amount of muscular energy during the long hours she works.

CONSTITUENTS OF A DIET

So far only the energy value of a diet has been considered. This constitutes but one of several factors which go to constitute a diet adequate to maintain health and working capacity. In addition to its energy value (as expressed in calories) a diet should be made up of proteins, fats, and carbohydrates in certain proportions, and should also contain sufficient quantities of vitamins and minerals.

Proteins

Physiologists agree that between 10 and 15 per cent. of the total daily calorie requirements of the body should be derived from proteins. Any less proportion is insufficient to promote growth and tissue repair. It would appear to be fairly simple to supply this amount of protein, but a complication is introduced by the fact that the nutritional or "biological" value of proteins from different sources varies enormously. Proteins of animal origin—milk, cheese, eggs, meat, fish, etc.—have a higher nutritional value, and can be much more readily assimilated and made use of in the body than the proteins derived from vegetable sources—peas, beans, potatoes, carrots, etc.

It is now usual to differentiate the protein foodstuffs into two classes. Proteins from animal sources are designated as first-class proteins, whilst those of vegetable origin are relegated to the second class. The first-class proteins, besides possessing a higher nutritional value than second-class proteins, are more nearly completely absorbed by the body. Vegetable proteins are absorbed in varying proportions, which rarely exceed 80 per cent.

There is a measure of agreement that from 10 to 15 per cent. of the daily calories should be derived from protein, and 100 grams of protein per day will provide 12 per cent. of the total daily calorie supply of 3,400. Further, the view accepted is that this 100 daily grams of protein should contain a proportion of first-class protein. The minimum requisite daily quantity of first-class protein has been assessed at 37 grams per day. It appears that this figure was calculated upon the protein of milk, which has a high biological value, and there is some doubt as to the adequacy of this quantity when supplied by other animal proteins. The standard ration of Army troops in peace time provides 62.7 grams of first-class protein per day, and we know that this quantity is enough to keep them in health and physical fitness. It is not suggested that the figure of 62.7 grams of first-class protein should be taken to constitute a minimum. The Committee is of the opinion that a figure somewhere between 37 and 62.7 should be adopted, and agrees that 50 grams of first-class pro-

tein per day is sufficient to maintain the health and working capacity of the average man.

The figure of 50 grams of first-class protein represents half the daily protein intake. The other half can be furnished from vegetable sources.

Fats

One hundred grams of fat per day is usually accepted as an adequate quantity. For reasons which will be set out subsequently, as much of the fat as possible should be derived from certain animal sources.

Carbohydrates

Carbohydrates (starch and sugar) constitute the cheapest source of energy, and 500 grams are necessary to bring up the total of calories to 3,400.

TABLE II.—*Daily Requirements of an Adult Male of Calories, Protein, Fat, and Carbohydrates*

Total calories required: 3,400 in food as purchased.

Derived from—	Quantity	Percentage of Total Calories	Number of Calories
	grams		
First-class protein ...	50	6	205
Second	50	6	205
Fat	100	27	930
Carbohydrate... ..	500	61	2,050
Totals	700	100	3,390

(N.B.—28.4 grams=1 ounce.)

A diet can be so constructed as to contain the various constituents of food in the above proportions by reference to the tables contained in Appendix A of this report.

Diets of Infants and Young Children.—The proportions of proteins, fats, and carbohydrates set out above are those suitable for adults. In the case of breast-fed infants the proportions are somewhat different, for the ratio of calories in their diet derived from fat is considerably higher and from carbohydrates somewhat lower. Also, the whole of the protein they consume is first-class protein. It cannot be assumed that it is a correct physiological procedure to alter these ratios to the adult proportions immediately the infant is weaned.

Experience of the feeding of infants and young children shows that satisfactory growth is most readily obtained if this change is a gradual one, and is not completed until somewhere between the ages of 3 and 5 years. This factor has an important bearing upon the cost of feeding infants and young children, and will be dealt with in a later section. From a practical point of view the easiest way of giving additional fat and, incidentally, first-class protein and mineral substances to a young child is by the addition of milk to its diet. From the theoretical point of view it should not be impossible to devise a physiologically adequate diet for children, after the usual age of weaning, without the inclusion in it of milk. The value of milk as a food for young children is, however, greater than its mere constituents of protein and fat. It is desirable, therefore, that the diet of young children should contain, each day, some milk. The quantity cannot be fixed absolutely, and will necessarily vary according to the amount of butter and cheese ingested, and also according to the idiosyncrasies of the individual child. The fact must not be lost sight of that some children are unable to or will not take much milk. It is considered that 1 pint of milk per day from the age of 1 to 5 years and of half a pint a day to 10 years constitutes a sufficient and safe quantity, but more could be given with advantage. Beyond the age of 10 years the consumption of milk by children is desirable but not essential, provided the diet is adequate and well balanced. The dietary requirements of infants under 1 year of age are not considered in detail in this report. Textbooks on child welfare should be consulted for information on this subject.

Minerals and Vitamins

A diet may contain an adequate number of calories and the correct proportions of proteins, fats, and carbohydrates and yet be incapable of supporting health or even life, or, in the case of children, of permitting normal growth. Vitamins and minerals are necessary constituents of any diet.

Vitamins.—No ready method is yet available for assessing quantitatively the needs of the body, whether adult or juvenile, for the various vitamins or, further,

of accurately assessing the vitamin contents of a diet. It is possible, however, to state in general terms whether any particular article of diet does or does not constitute a source of particular vitamins. It is known that the following vitamins are necessary to maintain health and/or growth: A, B (a group of several vitamins), C, and D. An excess of one vitamin cannot compensate for deficiency in another, and the best possible safeguard against a shortage of any one or more vitamins is insistence on as great a variety of foodstuffs in a dietary as possible, and the invariable inclusion in it of dairy produce and fresh fruits and green vegetables. Appendix B to this report contains a list of foods in common use which are known to contain vitamins. In the construction of a dietary attention should always be paid to the inclusion of sufficient quantities of vitamin-containing foods. If there is doubt as to the sufficiency of these accessory food factors it is advisable to include in the daily ration a few drachms of cod-liver oil, or cod-liver oil emulsion, of *certified vitamin content*. By this means a requisite supply of vitamins A and D is assured. But a word of caution is necessary here, for it will be far better for a housewife to spend money on good wholesome vitamin-containing foodstuffs than to buy costly preparations of the concentrated vitamin-containing products.

Minerals.—For normal growth and healthy functioning the body requires a supply of minerals, of which calcium, phosphorus, iron, iodine, and chlorine are the chief. Chlorine is rarely deficient, as common salt—the usual source of chlorine—is extremely cheap, and enters into the preparation of most foodstuffs. Shortage of calcium, phosphorus, and iron is not uncommon.

CONSTRUCTION OF DIETARY TABLES

General Considerations

The construction of dietaries which will conform to the several criteria laid down in the preceding paragraphs of this report is a somewhat complicated procedure, for unless due care be exercised some one or more constituents may be found to be missing or out of balance. The difficulty is increased when it is necessary, as here, to work to minimum costs.

Where the amount of money available for the purchase of food is not strictly limited the choice of a diet may be safely left to the individual taste, if the guiding principle of procuring as great a variety of foodstuffs as possible is adhered to. Consideration of budgets obtained from working-class families indicates that the average housewife, with no expert knowledge of calories, proteins, etc., does, in fact, purchase by rule-of-thumb methods foodstuffs which broadly approximate to dietaries considered by physiologists to be satisfactory. The above statement is subject to her purchasing powers proving adequate to the needs of her family. When the amount of money available for the purchase of food is not enough to enable the housewife to buy what she wants (and, without understanding the scientific reasons, she usually wants the right things in approximately the right quantities) she must economize in certain directions. Experience has taught her that she must avoid complaints of hunger and of "emptiness" from her family, so she buys a smaller proportion of expensive proteins and fats (such as butter) and a higher proportion of cheap carbohydrates—usually bread and, according to their seasonal price, potatoes.

Speaking in general terms, the dietetic value of the foodstuffs purchased is more or less directly proportional to the amount of money available for their purchase. In cases in which money is short deficiencies are most likely to occur in first-class (animal) proteins and in the minerals and vitamins, due to meagre purchase of dairy produce and green vegetables.

A common fault in the dietaries of young children is a shortage of first-class protein. The popular prejudice against giving meat and cheese to children of this age is not based upon physiological data.

When constructing a dietary due regard should be paid to the usual dietetic habits and tastes of the people ; variety should be aimed at, and the seasonal scarcity or plenty of individual foodstuffs taken into account. While, in general, fresh foodstuffs are preferable, tinned foods, and in particular tinned fruits and tomatoes, afford a convenient and not too expensive means of obtaining certain vitamins and minerals during seasons when fresh fruit is unobtainable or expensive.

Food Prices

The staple articles of food—meat, bacon, flour, bread, sugar, etc.—have not, during the past two years, been subject to violent or seasonal fluctuations in price. Foods such as milk, butter, eggs, and potatoes are normally subject to seasonal variations in price, but during the past two years their seasonal variations have been regular. The two years' stability of prices has, however, been disturbed since the middle of August, 1933. There has occurred a sharp rise in the price of bacon, while butter and flour prices have increased slightly.

The Ministry of Labour cost of living figures, which are issued monthly, provide a convenient guide to the prices of certain common foodstuffs, but it must be recognized that these figures constitute a mean of prices ruling in working-class and residential districts, and are derived from various types of shops. In actual experience it is found that sometimes the housewife is able to purchase some, at least, of the foodstuffs at a lower cost than the prices officially quoted in the *Ministry of Labour Gazette*. This statement is confirmed by information extracted from price lists and actual family budgets kindly supplied to the Committee by medical officers of health in various parts of the country. According to the family budgets supplied the housewives were able to purchase many articles of food at prices lower than those quoted by the medical officers of health as ruling at the time in their areas.

Very detailed records of the prices of foodstuffs in Stockton-on-Tees were available for the use of the Committee. These figures had been obtained by inquiries made each week over a period of two years from sixteen grocers' and nine butchers' shops in that town. The lists are of value, in that they cover fifty articles of food in common use as against twenty articles in the Ministry of Labour returns. The Stockton lists are set out in Appendix C.

In the compilation of the specimen diets the average prices prevailing over twelve months in Stockton-on-Tees have been employed, and by taking the means of fifty-two weeks, seasonal variations are eliminated.

Certain medical officers of health in various parts of the country very kindly furnished the Committee with the prices current in these areas during two weeks this summer. The means of these prices for the foodstuffs have been taken, and these and the Stockton prices have been used in calculating the costs of the dietaries which have been compiled. It should be pointed out that the mean B.M.A. prices have been used for the cost scales in which the purchase of bread instead of flour is allowed for, as it is not a common practice, except in the North of England, for bread to be made at home. This fact accounts for a considerable part of the increased cost of food per man-value as based on the B.M.A. mean figures as compared with the Stockton prices.

While the cost per man-value on the Stockton price scale may reasonably be taken as a minimum, this scale would not necessarily apply to all localities or for housewives less favourably situated in regard to markets. The Committee is therefore of the opinion that while no single figures for the minimum cost can be regarded as generally applicable, yet it may prove of value to state a range of cost within which it should be possible to purchase adequate food for the maintenance of health and working capacity.

This range of cost is indicated in each dietary—namely, the cost per man-value per week on the Stockton price scale, and the cost as based on the mean figures furnished by medical officers of health. For example, Dietary No. 14 for man, wife, and three young children under 6 can be purchased at Stockton prices at a cost of 5s. 5d. per man-value per week, while on the B.M.A. mean scale the cost would be 6s. 4½d. Moreover, intermediate or even higher figures might apply to certain localities, for, as previously stated, the scales adopted show average, not universal, prices.

If the Ministry of Labour figures are preferred to those which have been used, it will be necessary to adjust the prices of those items contained in the Ministry's list as included in Appendix C.

Variations in these prices in any particular district, or at any particular time, can be inserted and used as may be necessary.

Specimen Diets

The diet of the adult male forms the "unit" upon which family diets are calculated as to quantities. The daily requirements of the adult male have been set out in foregoing sections of this report. Briefly, they consist of 100 grams of protein—of which 50 per cent. should be first-class protein—100 grams of fat, and 500 grams of carbohydrate, giving a total daily calorie supply of 3,400 as purchased. In practice it is much simpler to calculate a diet for a week than for one day, and all the specimen diets prepared have been based on this time period.

Mere calorie requirements are easy to satisfy. The adult male could obtain all the calories he needs for a week from 23 lb. of bread, but no scientific argument is required to demonstrate that such a diet would be quite unsuitable for maintaining health and working capacity. The proportions of protein, fat, and carbohydrate would be, in such a diet, hopelessly wrong, and there would be a deficiency of vitamins and minerals. Taste and appetite, which are largely controlled by physiological needs, would rebel against such a monotonous and unsatisfactory diet. Due regard to these facts has been taken in preparing specimen family dietaries as required by the terms of reference of the Committee.

INDIVIDUAL AND FAMILY DIETARIES

Variety

It will be noted that in all the diets, with the exception of those for very young children, approximately half of the total calories is supplied by flour in bread, and sugar. There would, of course, be no objection to the housewife purchasing the appropriate quantities of bread for flour or vice versa, or in case of sugar, replacing part with treacle or syrup in order to gain variety.

Bread and Flour

In the North of England it is the usual practice of working-class families to bake their own bread. Home baking of bread is not common in the South.

One stone (14 lb.) of flour gives, when baked at home, approximately 20 lb. of bread. The price of flour varies in the North according to the grade—from 1s. 3d.

to 1s. 10d. per stone. Each stone of flour requires $1\frac{1}{4}$ lb. of yeast, which costs 2d. Without taking into account the amount of fuel used the cost to the housewife of 20 lb. of home-made bread varies from 1s. 5d. to 2s. Twenty pounds of bread purchased in a shop would cost, in the North of England, 3s. 4d.

In the South of England the price of bread as purchased by the housewife is slightly lower than in the North, but the cost of flour is higher, as is also the cost of fuel.

We calculate that the housewife who bakes her own bread and is able to purchase coal at the rates prevalent in the North saves 3d. per "man" per week on the amount spent by the housewife who purchases bread.

Milk

In the case of families of limited means it is improbable that separate food supplies (apart from certain items, such as milk) will be purchased for the children. The specimen diets for adults set out in this report are, speaking generally, suitable for children, and the man-value equivalent of their ages will give their approximate calorie requirements. A breast-fed infant obtains the whole of its protein in the form of milk protein. When the infant is weaned it must obtain its protein from sources other than maternal. A sound guiding principle in the dietetic regime for children is that the change-over should be gradual, and that, for some considerable time, milk should be the source of a high proportion of the protein and fat supplies.

The general consensus of opinion upon the value of milk as a food for young children is so strong that it should be included in every case in the diet of children in order to maintain health and normal growth. The Committee desires to emphasize the importance of this foodstuff.

In compiling specimen diets for children between the ages of 1 and 5, 1 pint of milk has been taken as the basal primary requirement, and the full diet has been constructed upon this foundation. In the diets for children between 5 and 10 years, half a pint of milk has been used as the base. The price, $2\frac{3}{4}$ d. per pint, used in the diets was the mean of summer and winter prices.

Fruit and Vegetables

The item of 1d. per day for fruit and vegetables requires some comment. Owing to the seasonal scarcity and plenty of numerous fruits and vegetables it has not been found practicable to include in specimen diets specific reference to individual fruits and vegetables. To have done so would have necessitated the multiplication of dietaries beyond the permissible limits of this report. It appears, therefore, to the members of this Committee that the most practicable method of overcoming this difficulty is to include in each specimen diet the sum of 1d. per man per day to cover the items of fruit and green vegetables. It is left to the common sense of the housewife to purchase as great a variety of these foodstuffs as seasonal prevalence and prices permit. For the same reasons as set out above the calorie value of sevenpennyworth of fruit and green vegetables cannot be calculated if there is daily or weekly variation in the items purchased under this head. A figure of 100 calories per man-value has therefore been added to each diet under the heading of fresh fruit and green vegetables, though in many instances this number might be exceeded. The value of fresh fruit and green vegetables lies, not in their calorie content, but in their vitamin and mineral constituents, and as such are necessary to complete a well-balanced diet.

Meat

Beef, Mutton, and Liver.—The quantities of these foodstuffs shown in the following diets can only be obtained at the prices specified if the imported frozen products are purchased.

COST

The higher cost of the dietaries on the B.M.A. mean scale as compared with the Stockton scale is mainly accounted for by the purchase of bread instead of flour. Actually 60 to 80 per cent. of the increased cost is thus accounted for, while the difference in price of tea and potatoes on the two scales also materially affects the weekly expenditure.

Children's Diets

The provision of milk raises the cost of children's diets beyond what would be their man-value equivalent.

of cost. Certain specimen diets are set out which show the minimum cost of the diets of children at various ages. During the compilation of these and other specimen diets set out in this report, constant vigilance has been exercised to keep the cost down to the minimum which permitted the purchase of an adequate diet. It has not been found possible to prepare a diet for a child alone at a less cost than half a crown a week.

One often hears the statement made that the addition of one extra individual to a family of four or five makes little or no difference to the weekly budget of the housewife. While this may be true in the case of families in which the amount of money spent on food is in excess of the minimum requirements, it is not so when the amount available for, or spent on, food is at or below the minimum required for an adequate diet, though some slight economies may be effected.

Individual Diets

Diet No. 1.—Bare Ration. No Variety. Man-value 1

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Corned beef ...	1 lb.	s. d. 6	s. d. 6	119.2	84.8	—	1,278
Cheese ...	2 lb.	1 1	1 0	233.2	317.6	28.2	4,022
Margarine...	$\frac{3}{4}$ lb.	3	3	0.7	288.5	—	2,684
Flour or ...	7 lb.	—	8	320.6	51.1	2,397.5	11,620
Bread ...	11 $\frac{1}{4}$ lb.	1 7 $\frac{3}{4}$	—	(367.9)	(10.1)	(2,454.8)	(11,666)
Sugar ...	1 $\frac{3}{4}$ lb.	4	4	—	—	793.8	3,255
Potatoes ...	3 $\frac{1}{2}$ lb.	2 $\frac{1}{2}$	1 $\frac{1}{2}$	30.1	0.4	287.4	1,306
Yeast ...	—	—	1	—	—	—	—
Tea ...	$\frac{1}{4}$ lb.	3	2 $\frac{1}{2}$	—	—	—	—
Fresh fruit and green vegetables	—	7	7	—	—	—	100
Total weekly quantities	—	4 10 $\frac{1}{4}$	3 9	703.8	742.4	3,506.9	24,265
Daily quantities per man	—	—	—	100.5	106.1	501.0	3,466

Total first-class protein, 352.4 grams.

Daily first-class protein, 50.3 grams.

Cost per man per week (B.M.A. mean), 58.25 pence.

Cost per man per week (Stockton mean), 45 pence.

Notes.—Diet No. 1

Diet No. 1 gives quantities of protein, fat, and carbohydrate, and of total calories adequate to support health and working capacity. This diet, though adequate in its principal constituents, may be deficient in vitamins and minerals, but the principal defect lies in the small number of its constituent foodstuffs. Though perhaps palatable for a period of one week it would with longer use rapidly become monotonous and nauseous. In order to avoid the repugnance which would inevitably follow the prolonged ingestion of such a diet, and to assure adequacy of vitamins and minerals, it is necessary to increase the number of foodstuffs so as to obtain greater variety.

Diet No. 2.—Suggested Adult Ration, based on 50 grams First-Class Protein. Giving 1/4 pint Milk. Man-value 1

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef ...	1 lb.	s. d. 6	s. d. 6	85.3	83.5	—	1,126
Minced meat ...	½ lb.	2½	2½	42.7	41.8	—	563
Bacon ...	½ lb.	3	2¾	23.3	122.9	—	1,239
Corned beef ...	½ lb.	3	3	59.6	42.4	—	639
Liver (ox) ...	¼ lb.	1¾	1¾	22.6	3.6	5.0	147
Eggs ...	2 oz.	1	1	6.3	5.7	0.8	82
Cheese ...	½ lb.	3¼	3	58.3	79.4	7.0	1,005
Milk ...	1¾ pts.	5	5	32.7	35.7	47.6	661
Fish (cod) ...	¼ lb.	1¼	1¼	16.6	0.1	—	69
Butter ...	¼ lb.	2½	2½	0.2	94.1	—	876
Suet ...	1 oz.	¼	¼	0.3	26.4	—	247
Lard ...	¼ lb.	1½	1¼	—	113.4	—	1,055
Flour or ...	4½ lb.	—	5	206.1	32.8	1,541.2	7,470
Bread ...	7¼ lb.	1 0½	—	(237.0)	(6.5)	(1,581.9)	(7,518)
Sugar ...	1 lb.	2¼	2¼	—	—	453.6	1,860
Jam ...	¾ lb.	3¼	3	1.1	—	236.1	972
Potatoes ...	5 lb.	3¾	2	43.0	0.5	410.5	1,865
Peas (dried) ...	¼ lb.	1	½	23.1	0.7	64.7	367
Tea ...	¼ lb.	3	2½	—	—	—	—
Oatmeal ...	½ lb.	1¼	1¼	27.0	19.5	158.7	943

Diet No. 2 (continued)

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Yeast	—	s. d. —	s. d. 1	—	—	—	—
Rice	$\frac{1}{4}$ lb.	$\frac{2}{4}$	$\frac{1}{2}$	6.7	0.5	91.1	405
Syrup (treacle) ...	$\frac{1}{2}$ lb.	2	2	0.7	—	173.3	714
Cabbage	1 lb.	1	1	3.2	0.2	17.7	88
Beans (butter) ...	$\frac{1}{4}$ lb.	$\frac{2}{4}$	$\frac{1}{2}$	21.1	0.8	70.5	383
Barley	$\frac{1}{2}$ lb.	1	1	15.8	1.8	181.2	825
Fresh fruit and green vegetables	—	7	7	—	—	—	100
Total weekly quantities	—	5 10 $\frac{1}{2}$	4 11 $\frac{3}{4}$	695.7	705.8	3,4 9.0	23,701
Daily quantities per man	—	--	—	99.4	100.8	494.1	3,386

Total first-class protein, 347.6 grams.

Daily first-class protein, 49.7 grams.

Cost per man per week (B.M.A. mean), 70.5 pence.

Cost per man per week (Stockton mean), 59.75 pence.

Notes.—Diet No. 2

This diet contains twenty-five different items of food as compared with eight in Diet No. 1. The amounts of proteins, fats, etc., are approximately the same as in Diet No. 1, but they are derived from more numerous sources, and the amounts of vitamins and minerals should be adequate. This diet should be much more palatable and less monotonous after prolonged use, but, of course, the cost is higher. The first-class proteins contained in it absorb 2s. 5d., or nearly 50 per cent. of the total cost. This is an adequate diet on which health and working capacity could be maintained over prolonged periods. This is a typical diet as commonly used by the working classes in receipt of adequate wages. In the case of unemployment, or when the income is from whatever reason reduced to such a level as renders an expenditure of 5s. per week per "man" difficult, saving is effected by reducing the quantities purchased of the first fourteen items on the sheet. The result of this is to diminish the amounts of first-class proteins and animal fats consumed. Such reductions seriously depreciate the physiological value

of the diet. No mutton is included, but if it is desired to have this form of meat it can be substituted for cheese and lard or suet.

Diet No. 3.—Adult Ration. No Meat or Fish. Man-value 1

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
		s. d.	s. d.				
Cheese	2 lb.	1 1	1 0	233.2	317.6	28.2	4,022
Milk	7 pts.	1 7 $\frac{1}{4}$	1 7 $\frac{1}{4}$	130.9	142.8	190.4	2,646
Butter	$\frac{1}{4}$ lb.	2 $\frac{1}{2}$	2 $\frac{1}{2}$	0.2	94.1	—	876
Margarine ...	$\frac{1}{4}$ lb.	1	1	0.2	96.2	—	895
Flour <i>or</i>	4 $\frac{1}{2}$ lb.	—	5	206.1	32.8	1 541.2	7,470
Bread	7 $\frac{1}{4}$ lb.	1 0 $\frac{3}{4}$	—	(237.0)	(6.5)	(1,581.9)	(7,518)
Sugar	1 $\frac{1}{2}$ lb.	3 $\frac{3}{4}$	3 $\frac{1}{2}$	—	—	680.4	2,790
Jam... ..	$\frac{1}{4}$ lb.	1	1	0.4	—	78.7	324
Potatoes	5 $\frac{1}{2}$ lb.	4	2 $\frac{1}{4}$	47.3	0.6	451.6	2,052
Peas (dried) ...	$\frac{1}{4}$ lb.	1	$\frac{1}{2}$	23.1	0.7	64.7	367
Yeast	—	—	1	—	—	—	—
Tea	$\frac{1}{4}$ lb.	3	2 $\frac{1}{2}$	—	—	—	—
Oatmeal	$\frac{1}{2}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	27.0	19.5	158.7	943
Rice (sago) ...	$\frac{1}{2}$ lb.	1 $\frac{1}{4}$	1	13.4	0.9	182.1	810
Beans (butter) ...	$\frac{1}{4}$ lb.	$\frac{3}{4}$	$\frac{1}{2}$	21.1	0.8	70.5	383
Fresh fruit and green vegetables	—	7	7	—	—	—	100
Total weekly quantities	—	5 11 $\frac{1}{2}$	5 0 $\frac{1}{4}$	702.9	706.0	3,446.5	23,678
Daily quantities per man	—	—	—	100.4	100.8	492.4	3,383

Total first-class protein, 364.3 grams.

Daily first-class protein, 52 grams.

Cost per man per week (B.M.A. mean), 71.5 pence.

Cost per man per week (Stockton mean), 60.25 pence.

Notes.—Diet No. 3

This diet has been devised to enable those persons who object to eating flesh foods to obtain a diet which is satisfactory as regards its constituents. The first-class protein in this diet is derived from milk and cheese. The cost is approximately the same as that of the preceding diet.

Notes.—Diets Nos. 4, 5, and 6

Diet No. 4 gives a specimen diet for a child 1 to 2 years of age. The basal item is 1 pint of milk per day at a cost of 1s. 7 $\frac{1}{4}$ d. This price equals 2 $\frac{3}{4}$ d. per pint, which is the average price over twelve months. In winter the price would be 3d. per pint and in summer 2 $\frac{1}{2}$ d. This diet should be adequate in all respects for a child of this age. Of a total of 40 grams of protein per day 28.2 grams consist of first-class protein.

Diet No. 4.—Child, 1 to 2 Years. Man-value 0.3. Percentage of First-class to Total Protein, 71 (approx.)

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Minced meat ...	$\frac{1}{4}$ lb.	s. d. 1 $\frac{1}{4}$	s. d. 1 $\frac{1}{4}$	21.3	20.8	—	282
Cheese ...	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	29.2	39.7	3.5	503
Milk ...	7 pts.	1 7 $\frac{1}{4}$	1 7 $\frac{1}{4}$	130.9	142.8	190.4	2,646
Fish ...	$\frac{1}{4}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	16.0	12.6	—	183
Butter ...	$\frac{1}{8}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	0.1	47.1	—	438
Flour <i>or</i> ...	1 lb.	—	1 $\frac{1}{4}$	45.8	7.3	342.5	1,660
Bread ...	1 $\frac{1}{2}$ lb.	2 $\frac{3}{4}$	—	(34.1)	(1.4)	(327.3)	(1,550)
Sugar ...	$\frac{1}{8}$ lb.	$\frac{1}{4}$	$\frac{1}{4}$	—	—	56.7	233
Potatoes ..	1 lb.	$\frac{3}{4}$	$\frac{1}{2}$	8.6	0.1	82.1	373
Tomatoes...	$\frac{1}{2}$ lb. tin	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1.6	0.2	10.2	51
Carrot ...	$\frac{1}{2}$ lb.	$\frac{1}{2}$	$\frac{1}{2}$	2.7	0.2	21.8	103
Turnip ...	$\frac{1}{2}$ lb.	$\frac{1}{2}$	$\frac{1}{2}$	2.7	0.2	10.0	54
Oatmeal ...	$\frac{1}{4}$ lb.	$\frac{3}{4}$	$\frac{3}{4}$	13.5	9.8	79.4	472
Cabbage ...	$\frac{1}{2}$ lb.	$\frac{1}{2}$	$\frac{1}{4}$	1.6	0.1	8.9	44
Total weekly quantities	—	2 8	2 6	274.0	280.9	805.5	7,042
Daily quantities	—	—	—	39.1	40.1	115.1	1,006

Total first-class protein, 197.5 grams.

Daily first-class protein, 28.2 grams.

Total cost of first-class protein foods, 24.5 pence.

Cost per child of 1 to 2 years per week (B.M.A. mean), 32 pence.

Cost per child of 1 to 2 years per week (Stockton mean), 30 pence.

Diet No. 5.—Child, 2 to 3 Years. Man-value 0.4. Percentage of First-class to Total Protein, 62.5 (approx.)

Item	Quantity	Price B.M.A. Mean		Price Stockton Mean		Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Minced meat ...	$\frac{1}{4}$ lb.	s.	d.	s.	d.	21.3	20.9	—	282
Liver ...	$\frac{1}{4}$ lb.		1 $\frac{3}{4}$		1 $\frac{3}{4}$	22.6	3.6	5.0	147
Milk... ..	7 pts.	1	7 $\frac{1}{4}$	1	7 $\frac{1}{4}$	130.9	142.8	190.4	2,646
Butter ...	$\frac{1}{4}$ lb.		2 $\frac{1}{2}$		2 $\frac{1}{2}$	0.2	94.1	—	876
Flour or ...	1 $\frac{1}{2}$ lb.		—		1 $\frac{3}{4}$	68.7	10.9	513.8	2,490
Bread ...	2 $\frac{1}{2}$ lb.		4 $\frac{1}{2}$		—	(81.8)	(2.3)	(545.5)	(2,593)
Sugar ...	1 lb.		2 $\frac{1}{4}$		2 $\frac{1}{4}$	—	—	453.6	1,860
Potatoes ...	1 lb.		$\frac{3}{4}$		$\frac{1}{2}$	8.6	0.1	82.1	373
Oatmeal ...	$\frac{1}{4}$ lb.		$\frac{3}{4}$		$\frac{3}{4}$	13.5	9.8	79.4	472
Semolina ...	$\frac{1}{4}$ lb.		$\frac{1}{2}$		$\frac{1}{2}$	12.9	1.3	85.4	415
Cabbage ...	$\frac{1}{2}$ lb.		$\frac{1}{2}$		$\frac{1}{4}$	1.6	0.1	8.9	44
Carrot ...	1 lb.		$\frac{3}{4}$		$\frac{3}{4}$	5.4	0.4	43.6	205
Fresh fruit and green vegetables	—		2		2	—	—	—	40
Total weekly quantities	—	3	0 $\frac{3}{4}$	2	9 $\frac{1}{2}$	285.7	284.0	1,462.2	9,850
Daily quantities	—	—	—	—	—	40.8	40.6	208.9	1,407

Total first-class protein, 175 grams.

Daily first-class protein, 25 grams.

Total cost of first-class protein foods, 24.75 pence.

Cost per child of 2 to 3 years per week (B.M.A. mean),
36.75 pence.

Cost per child of 2 to 3 years per week (Stockton mean),
33.5 pence.

Almost all the fat is of animal origin, and should contain a sufficiency of vitamins A and D. In this particular diet tomatoes, carrot, turnip, and cabbage are included at a cost of 3d. per week. These various items could be grouped under the heading fresh fruit and green vegetables, as in the preceding adult diets, and 3d. or 3 $\frac{1}{2}$ d. set down as the cost. This course is probably preferable, as it allows for greater choice in the selection of foodstuffs under this heading and for seasonal variations in price and supply of the numerous articles which could be included under this heading. The cost

of this diet on the Stockton scale is 2s. 6d., which amounts to 50 per cent. of the cost of the diet of an individual adult male.

Diets Nos. 5 and 6 are designed for children of from 2 to 3 years and 3 to 6 years respectively, and each provides 1 pint of milk per day.

In each of the three diets, Nos. 4, 5, and 6, the foodstuffs supplying the first-class protein are interchangeable as cost.

Diet No. 6.—Child, 3 to 6 Years. Man-value 0.5. Percentage of First-class to Total Protein, 50 (approx.)

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Bacon ...	$\frac{1}{4}$ lb.	s. d. 1 $\frac{1}{2}$	s. d. 1 $\frac{1}{2}$	11.7	61.5	—	620
Corned Beef ...	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	29.8	21.2	—	320
Milk... ..	7 pints	1 7 $\frac{1}{4}$	1 7 $\frac{1}{4}$	130.9	142.8	190.4	2,646
Butter	$\frac{1}{4}$ lb.	2 $\frac{1}{2}$	2 $\frac{1}{2}$	0.2	94.1	—	876
Flour or	2 $\frac{1}{2}$ lb.	—	3	114.5	18.3	856.3	4,150
Bread	4 lb.	7	—	(130.8)	(3.6)	(872.8)	(4,148)
Sugar	1 lb.	2 $\frac{1}{4}$	2 $\frac{1}{4}$	—	—	453.6	1,860
Potatoes	1 lb.	$\frac{3}{4}$	$\frac{1}{2}$	8.6	0.1	82.1	373
Peas (dried) ...	$\frac{1}{4}$ lb.	1	$\frac{1}{2}$	23.1	0.7	64.7	367
Oatmeal	$\frac{1}{4}$ lb.	$\frac{3}{4}$	$\frac{3}{4}$	13.5	9.8	79.4	472
Beans (haricot) ...	$\frac{1}{4}$ lb.	$\frac{3}{4}$	$\frac{1}{2}$	20.2	0.6	73.2	388
Fresh fruit and green vegetables	—	3 $\frac{1}{2}$	3 $\frac{1}{2}$	—	—	—	50
Total weekly quantities	—	3 4 $\frac{3}{4}$	2 11 $\frac{3}{4}$	352.5	349.1	1,799.7	12,122
Daily quantities	—	—	—	50.4	49.9	257.1	1,732

Total first-class protein, 176.2 grams.

Daily first-class protein, 24.7 grams.

Total cost of first-class protein foods, 24.75 pence.

Cost per child of 3 to 6 years per week (B.M.A. mean),
40.75 pence.

Cost per child of 3 to 6 years per week (Stockton mean),
35.75 pence.

As mentioned in an earlier paragraph the infant before weaning obtains all its protein as first-class protein, whilst an adult's ration of protein may consist of 50 per cent. vegetable protein. It is desirable that the change from 100 per cent. first-class protein to 50 per cent. first-class and 50 per cent. second-class should be gradual. These diets have therefore been constructed to permit of this gradual change in the ratio. In the case of the child from 1 to 2 years of age the proportion budgeted for has been 71 per cent. first-class protein and 29 per cent. second class. For the 2 to 3 years old child the proportions are 62 per cent. and 38 per cent. For the 3 to 6 years old these proportions have been brought up to 50 per cent. of each form of protein. These proportions have been designed to give a gradual change-over. The actual figures and percentages have been arbitrarily adopted to form a general guide.

Diets 4, 5, and 6 show a slight progressive increase in cost. This increase in cost is accounted for in items other than first-class protein. Had the proportion of first-class protein to the total diet been maintained at the same level as in Diet No. 4 the total cost of Diets 5 and 6 would have been slightly higher, but the gradual increase in the proportion of second-class protein has kept the cost down.

In Diet No. 5 a sum of 2d. per week has been included to cover the cost of fruit and green vegetables, though, as explained in the notes on Diet No. 4 the actual items under this heading are not specified. In Diet No. 6, 3½d. has been included for a similar reason.

Notes.—Diets Nos. 7 and 8

Diets Nos. 7 and 8 provide for children from 6 to 10 years of age, and give half a pint of milk per day. The minimum cost of No. 7 is approximately 3s. per week and of No. 8 3s. 6d. It is unnecessary to set out separate diets for children of from 10 to 14, for these may be taken as their man-value equivalent in constitution and price of diet for an adult male.

Diet No. 7.—Child, 6 to 8 Years. Man-value 0.6

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	$\frac{1}{4}$ lb.	s. d. 1 $\frac{1}{2}$	s. d. 1 $\frac{1}{2}$	21.3	20.9	—	282
Minced meat ...	$\frac{1}{4}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	21.3	20.9	—	282
Bacon	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11.7	61.5	—	620
Corned beef ...	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	29.8	21.2	—	320
Liver	$\frac{1}{4}$ lb.	1 $\frac{3}{4}$	1 $\frac{3}{4}$	22.6	3.6	5.0	147
Cheese	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	29.2	39.7	3.5	503
Milk... ..	3 $\frac{1}{2}$ pts.	9 $\frac{3}{4}$	9 $\frac{3}{4}$	65.4	71.4	95.2	1,323
Butter	$\frac{1}{4}$ lb.	2 $\frac{1}{2}$	2 $\frac{1}{2}$	0.2	94.1	—	876
Flour or	3 $\frac{1}{2}$ lb.	—	4	160.3	25.5	1,198.7	5,810
Bread	5 $\frac{1}{2}$ lb.	9 $\frac{3}{4}$	—	(179.9)	(5.0)	(1,200.1)	(5,704)
Sugar	1 lb.	2 $\frac{1}{4}$	2 $\frac{1}{4}$	—	—	453.6	1,860
Potatoes	2 $\frac{1}{2}$ lb.	2	1	21.5	0.2	205.3	933
Oatmeal	$\frac{1}{4}$ lb.	$\frac{3}{4}$	$\frac{3}{4}$	13.5	9.8	79.4	472
Cocoa	$\frac{1}{4}$ lb.	3	3	20.5	30.4	45.7	554
Fresh fruit and green vegetables	—	3 $\frac{1}{2}$	3 $\frac{1}{2}$	—	—	—	50
Total weekly quantities	—	3 6 $\frac{1}{2}$	2 11 $\frac{3}{4}$	417.3	399.2	2,086.4	13,982
Daily quantities	—	—	—	59.6	57.0	298.1	1,997

Total first-class protein, 201.5 grams.

Daily first-class protein, 28.8 grams.

Total cost of first-class protein foods, 21.25 pence.

Cost per child of 6 to 8 years (B.M.A. mean) 42.5 pence.

Cost per child of 6 to 8 years (Stockton mean), 35.75 pence.

Diets Nos. 2 to 8 (inclusive) are for single individuals. In their compilation care has been taken to ensure that fractions of farthings or ounces should be avoided. When larger quantities than are required for single individuals are purchased it is possible to make some slight saving in cost, as, for instance, in the elimination of odd farthings here and there, and also because of the fact that greater choice at varying costs is possible.

Diet No. 8.—Child, 8 to 10 Years. Man-value 0.7

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	$\frac{1}{4}$ lb.	s. d. 1 $\frac{1}{2}$	s. d. 1 $\frac{1}{2}$	21.3	20.9	—	282
Minced meat	$\frac{1}{2}$ lb.	2 $\frac{1}{2}$	2 $\frac{1}{2}$	42.7	41.8	—	563
Bacon	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11.7	61.5	—	620
Corned beef	$\frac{1}{4}$ lb.	1 $\frac{1}{2}$	1 $\frac{1}{2}$	29.8	21.2	—	320
Cheese	$\frac{1}{2}$ lb.	3	3	58.3	79.4	7.1	1,005
Milk... ..	3 $\frac{1}{2}$ pts.	9 $\frac{3}{4}$	9 $\frac{3}{4}$	65.4	71.4	95.2	1,323
Kipper (herring)	$\frac{1}{4}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	16.0	12.6	—	183
Butter	$\frac{1}{4}$ lb.	2 $\frac{1}{2}$	2 $\frac{1}{2}$	0.2	94.1	—	876
Dripping	$\frac{1}{8}$ lb.	$\frac{3}{4}$	$\frac{3}{4}$	—	56.7	—	527
Flour or	3 $\frac{1}{2}$ lb.	—	4	160.3	25.5	1,198.7	5,810
Bread	5 $\frac{1}{2}$ lb.	9 $\frac{3}{4}$	—	(179.9)	(5.0)	(1,200.1)	(5,704)
Sugar	1 lb.	2 $\frac{1}{4}$	2 $\frac{1}{4}$	—	—	453.6	1,860
Jam... ..	$\frac{1}{4}$ lb.	1 $\frac{1}{4}$	1	0.4	—	78.7	324
Potatoes	2 lb.	1 $\frac{1}{2}$	1	17.2	0.2	164.2	746
Figs... ..	$\frac{1}{4}$ lb.	1	1	2.3	0.6	64.1	277
Peas (dried)	$\frac{1}{4}$ lb.	1	$\frac{1}{2}$	23.1	0.7	64.7	367
Carrot	1 lb.	$\frac{3}{4}$	$\frac{3}{4}$	5.4	0.4	43.6	205
Oatmeal	$\frac{1}{4}$ lb.	$\frac{3}{4}$	$\frac{3}{4}$	13.5	9.8	79.4	472
Cocoa	$\frac{1}{4}$ lb.	3	3	20.5	30.4	45.7	554
Cabbage	$\frac{1}{2}$ lb.	$\frac{1}{2}$	$\frac{1}{4}$	1.6	0.1	8.9	44
Barley	$\frac{1}{4}$ lb.	$\frac{1}{2}$	$\frac{1}{2}$	7.9	0.9	90.6	413
Fresh fruit and green vegetables	—	3 $\frac{1}{2}$	3 $\frac{1}{2}$	—	—	—	50
Total weekly quantities	—	4 2	3 6 $\frac{3}{4}$	497.6	528.2	2,394.5	16,821
Daily quantities	—	—	—	71.1	75.5	342.1	2,403

Total first-class protein, 245.4 grams.

Daily first-class protein, 35.1 grams.

Total cost of first-class protein foods, 23.5 pence.

Cost per child of 8 to 10 years per week (B.M.A. mean),
50 pence.

Cost per child of 8 to 10 years per week (Stockton mean),
42.75 pence.

Family Diets

Diet No. 9.—Man, Wife, and One Child, aged 1 to 2 Years:
Man-value 2.13

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	1½ lb.	s. d. 9	s. d. 9	128.0	125.3	—	1,689
Minced meat ...	1 lb.	5	5	85.3	83.5	—	1,126
Bacon	1 lb.	6	5½	46.7	245.8	—	2,478
Corned beef ...	1 lb.	6	6	119.3	84.8	—	1,278
Liver	½ lb.	3½	3½	45.2	7.3	10.0	294
Eggs	½ lb.	4	4	25.2	22.9	3.2	330
Cheese	1¼ lb.	7¾	7½	145.8	198.5	17.6	2,514
Milk	10½ pts.	2 5	2 5	196.8	214.2	285.6	3,969
Fish (cod) ...	½ lb.	2½	2½	33.1	0.2	—	138
Butter	½ lb.	5	4¾	0.5	188.3	—	1,752
Suet	⅛ lb.	¾	¾	0.7	53.0	—	495
Lard	½ lb.	3	2½	—	226.8	—	2,110
Flour or	13 lb.	—	1 2¾	595.4	94.9	4,452.5	21,580
Bread	20¾ lb.	3 0¼	—	(678.5)	(18.7)	(4,527.7)	21,518
Sugar	1½ lb.	3¾	3½	—	—	680.4	2,790
Jam	1 lb.	4¼	4	1.4	—	314.8	1,296
Potatoes	7 lb.	5	3	60.2	0.7	574.7	2,611
Peas	½ lb.	1¾	1	46.3	1.4	129.5	734
Yeast	—	—	1½	—	—	—	—
Tea	½ lb.	6	5	—	—	—	—
Oatmeal	½ lb.	1¼	1¼	27.0	19.5	156.7	943
Rice (sago) ...	½ lb.	1¼	1	13.4	0.9	182.1	810
Treacle	½ lb.	2	2	3.7	—	135.9	572
Beans (butter) ...	½ lb.	1½	1	42.2	1.6	141.1	766
Fresh fruit and green vegetables	—	1 5½	1 5½	—	—	—	300
Total weekly quantities	—	13 6	11 3½	1,616.2	1,569.5	7,084.1	50,575
Daily quantities per man	—	—	—	108 4	105.3	475.1	3,392

Total first-class protein, 826.6 grams.

Daily first-class protein per man, 55.4 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	63.5 pence	76.1 pence
Minimum weekly cost of family food	11s. 3½d.	13s. 6d.

*Diet No. 10.—Man, Wife, and One Child, aged 2 to 3 Years:
Man-value, 2.23*

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	$\frac{1}{2}$ lb.	s. d. 3	s. d. 3	42.7	41.8	—	563
Minced meat ...	1 lb.	5	5	85.3	83.5	—	1,126
Bacon	1 lb.	6	5 $\frac{1}{2}$	46.7	245.8	—	2,478
Corned beef ...	1 lb.	6	6	119.3	84.8	—	1,278
Liver	$\frac{1}{2}$ lb.	3 $\frac{1}{2}$	3 $\frac{1}{2}$	45.2	7.3	10.0	294
Cheese	2 lb.	1 0 $\frac{1}{2}$	1 0	233.2	317.6	28.2	4,022
Milk	10 $\frac{1}{2}$ pts.	2 5	2 5	196.8	214.2	285.6	3,969
Fish (kipper) ...	$\frac{1}{4}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	16.0	12.6	—	183
Butter	$\frac{1}{2}$ lb.	5	4 $\frac{3}{4}$	0.5	188.3	—	1,752
Fish (cod)	$\frac{1}{4}$ lb.	1 $\frac{1}{4}$	1 $\frac{1}{4}$	16.1	0.1	—	69
Lard	$\frac{1}{2}$ lb.	3	2 $\frac{1}{2}$	—	226.8	—	2,110
Flour <i>or</i>	13 $\frac{1}{4}$ lb.	—	1 2 $\frac{3}{4}$	606.9	96.7	4,538.2	21,995
Bread	21 $\frac{1}{2}$ lb.	3 1 $\frac{1}{4}$	—	(694.9)	(19.2)	(4,636.8)	(22,036)
Sugar	2 lb.	4 $\frac{1}{2}$	4 $\frac{1}{2}$	—	—	907.2	3,720
Jam	1 lb.	4 $\frac{1}{4}$	4	1.4	—	314.8	1,296
Potatoes	7 lb.	5	3	60.2	0.7	574.7	2,611
Peas (dried) ...	$\frac{1}{2}$ lb.	1 $\frac{3}{4}$	1	46.3	1.4	129.5	734
Yeast	$\frac{1}{4}$ lb.	—	1 $\frac{1}{2}$	—	—	—	—
Tea	$\frac{1}{2}$ lb.	6	5	—	—	—	—
Oatmeal	1 lb.	2 $\frac{1}{2}$	2	54.0	39.0	317.5	1,886
Rice... ..	$\frac{1}{2}$ lb.	1 $\frac{1}{4}$	1	13.4	0.9	182.1	810
Treacle	$\frac{1}{2}$ lb.	2	2	3.7	—	135.9	572
Beans (butter) ...	$\frac{1}{2}$ lb.	1 $\frac{1}{2}$	1	42.2	1.6	141.1	766
Barley	$\frac{1}{4}$ lb.	$\frac{1}{2}$	$\frac{1}{2}$	7.9	0.9	90.6	413
Fresh fruit and green vegetables	—	1 5 $\frac{1}{2}$	1 5 $\frac{1}{2}$	—	—	—	300
Total weekly quantities	—	13 3 $\frac{1}{2}$	10 11 $\frac{1}{2}$	1,637.7	1,564.0	7,655.3	52,947
Daily quantities per man	—	—	—	104.9	100.2	490.4	3,392

Total first-class protein, 801.8 grams.

Daily first-class protein per man, 51.4 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	59 pence	71.5 pence
Minimum weekly cost of family food	10s. 11 $\frac{1}{2}$ d.	13s. 3 $\frac{1}{2}$ d.

*Diet No. 11.—Man, Wife, and One Child, aged 3 to 6 Years :
Man-value 2.33*

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	$\frac{1}{2}$ lb.	s. d. 3	s. d. 3	42.7	41.7	—	563
Minced meat ...	1 lb.	5	5	85.3	83.5	—	1,126
Bacon	1 lb.	6	5 $\frac{1}{2}$	46.7	245.8	—	2,478
Corned beef ...	1 lb.	6	6	119.3	84.8	—	1,278
Liver	$\frac{1}{2}$ lb.	3 $\frac{1}{2}$	3 $\frac{1}{2}$	45.2	7.3	10.0	294
Cheese	2 lb.	1 0 $\frac{1}{2}$	1 0	233.2	317.6	28.2	4,022
Milk... ..	10 $\frac{1}{2}$ pts.	2 5	2 5	196.8	214.2	285.6	3,969
Fish (kipper) ...	$\frac{3}{4}$ lb.	3 $\frac{3}{4}$	3 $\frac{3}{4}$	48.0	37.8	—	548
Butter	$\frac{1}{2}$ lb.	5	4 $\frac{3}{4}$	0.5	188.3	—	1,752
Lard (dripping) ...	$\frac{1}{2}$ lb.	3	2 $\frac{1}{2}$	—	226.8	—	2,110
Flour <i>or</i>	13 $\frac{1}{2}$ lb.	—	1 2 $\frac{3}{4}$	618.3	98.6	4,623.8	22,410
Bread	21 $\frac{1}{2}$ lb.	3 1 $\frac{3}{4}$	—	(703.1)	(19.4)	(4,691.3)	(22,296)
Sugar	2 $\frac{1}{2}$ lb.	5 $\frac{3}{4}$	5 $\frac{3}{4}$	—	—	1,134.0	4,650
Jam... ..	1 lb.	4 $\frac{1}{4}$	4	1.4	—	314.8	1,296
Potatoes	7 lb.	5	3	60.2	0.7	574.7	2,611
Peas (dried) ...	$\frac{3}{4}$ lb.	2 $\frac{1}{2}$	1 $\frac{1}{2}$	69.4	2.0	194.1	1,100
Yeast	$\frac{1}{4}$ lb.	—	1 $\frac{1}{2}$	—	—	—	—
Tea	$\frac{1}{2}$ lb.	6	5	—	—	—	—
Oatmeal	1 $\frac{1}{4}$ lb.	3 $\frac{1}{4}$	2 $\frac{1}{2}$	67.5	48.8	396.9	2,358
Rice... ..	$\frac{1}{2}$ lb.	1 $\frac{1}{4}$	1	13.4	0.9	182.1	810
Treacle	$\frac{1}{2}$ lb.	2	2	3.7	—	135.9	572
Beans (butter) ...	$\frac{1}{2}$ lb.	1 $\frac{1}{2}$	1	42.2	1.6	141.1	766
Barley	$\frac{1}{4}$ lb.	$\frac{1}{2}$	$\frac{1}{2}$	7.9	0.9	90.6	412
Fresh fruit and green vegetables	—	1 5 $\frac{1}{2}$	1 5 $\frac{1}{2}$	—	—	—	300
Total weekly quantities	—	13 8	11 3	1,701.7	1,601.3	8,111.8	55,425
Daily quantities per man	—	—	—	104.3	98.2	497.4	3,398

Total first-class protein, 817.7 grams.

Daily first-class protein per man, 50.1 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	57.9 pence	70.4 pence.
Minimum weekly cost of family food	11s. 3d.	13s. 8d.

*Diet No. 12.—Man, Wife, and One Child, aged 6 to 8 Years :
Man-value 2.43*

Item	Quantity	Price B.M.A. Mean		Price Stockton Mean		Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
		s.	d.	s.	d.				
Beef	1½ lb.		9		9	128.0	125.3	—	1,689
Minced meat ...	1 lb.		5		5	85.3	83.5	—	1,126
Bacon	1 lb.		6		5½	46.7	245.8	—	2,478
Corned beef ...	1 lb.		6		6	119.3	84.8	—	1,278
Liver	½ lb.		3½		3½	45.2	7.3	10.0	294
Cheese	2 lb.	1	0½	1	0	233.2	317.6	28.2	4,022
Milk	7 pts.	1	7¼	1	7¼	130.9	142.8	190.4	2,646
Kipper (herring)	1 lb.		5		5	64.0	50.4	—	730
Butter	½ lb.		5		4¾	0.5	188.3	—	1,752
Lard (dripping) ...	½ lb.		3		2½	—	226.8	—	2,110
Margarine ...	¼ lb.		1		1	0.2	96.2	—	895
Flour <i>or</i>	13¼ lb.	—	—	1	2¾	606.9	96.7	4,538.2	21,995
Bread	21¼ lb.	3	1¼	—	—	(694.9)	(19.2)	(4,636.6)	(22,036)
Sugar	3 lb.		6¾		6¾	—	—	1,360.8	5,580
Jam	1 lb.		4¼		4	1.4	—	314.8	1,296
Potatoes	7 lb.		5		3	60.2	0.7	574.7	2,611
Peas (split) ...	1 lb.		3½		2	92.1	3.2	285.8	1,579
Yeast	¼ lb.	—	—		1½	—	—	—	—
Tea	½ lb.		6		5	—	—	—	—
Oatmeal	1¼ lb.		3		2½	67.5	48.8	396.9	2,358
Rice	½ lb.		1¼		1	13.4	0.9	182.1	810
Treacle	½ lb.		2		2	3.7	—	135.9	572
Beans	½ lb.		1½		1	42.2	1.6	141.1	766
Barley	½ lb.		1		1	15.9	1.8	181.2	825
Fresh Fruit and Green Vegetables	—	1	5½	1	5½	—	—	—	300
Total Weekly quantities	—	13	8¼	11	3½	1,756.6	1,722.5	8,340.1	57,712
Daily quantities per man	—	—	—	—	—	103.3	101.3	490.3	3,393

Total first-class protein, 853.1 grams.

Daily first-class protein per man, 50.2 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	55.8 pence	67.6 pence
Minimum weekly cost of family food	11s. 3½d.	13s. 8¼d.

*Diet No. 13.—Man, Wife, and One Child, aged 8 to 10 Years :
Man-value 2.5*

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef... ..	1½ lb.	s. d. 9	s. d. 9	128.0	125.3	—	1,689
Minced meat ...	1½ lb.	7½	7½	128.0	125.3	—	1,689
Bacon	1 lb.	6	5½	46.7	245.8	—	2,478
Corned beef ...	1 lb.	6	6	119.3	84.8	—	1,278
Sausage	½ lb.	2½	2½	25.4	40.2	34.5	619
Cheese	2 lb.	1 0½	1 0	233.2	317.6	28.2	4,022
Milk... ..	7 pts.	1 7¼	1 7¼	130.9	142.8	190.4	2,646
Kipper (herring)...	1 lb.	5	5	64.0	50.4	—	730
Butter	½ lb.	5	4¾	0.5	188.3	—	1,752
Lard (dripping)...	½ lb.	3	2½	—	226.8	—	2,110
Margarine ...	¼ lb.	1	1	0.2	96.2	—	895
Flour <i>or</i>	14 lb.	—	1 3½	641.2	102.2	4,795	23,240
Bread	22½ lb.	3 3½	—	(735.8)	(20.3)	(4,909.5)	(23,333)
Sugar	4 lb.	9	9	—	—	1,814.4	7,440
Jam	1 lb.	4¼	4	1.4	—	314.8	1,296
Potatoes	7 lb.	5	3	60.2	0.7	574.7	2,611
Peas (split) ...	1 lb.	3½	2	92.1	3.2	285.8	1,579
Yeast	¼ lb.	—	1½	—	—	—	—
Tea	½ lb.	6	5	—	—	—	—
Oatmeal	½ lb.	1½	1½	27.0	19.6	158.8	944
Rice... ..	½ lb.	1¼	1	13.4	0.9	182.1	810
Treacle	½ lb.	2	2	3.7	—	135.9	572
Beans	½ lb.	1½	1	42.2	1.6	141.1	766
Barley	½ lb.	1	1	15.9	1.8	181.2	825
Fresh fruit and green vegetables	—	1 5½	1 5½	—	—	—	300
Total weekly quantities	—	14 0¾	11 7	1,773.3	1,773.5	8,836.9	60,291
Daily quantities per man	—	—	—	100.1	100.1	499.0	3,404

Total first-class protein, 876 grams.

Daily first-class protein per man, 49.5 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	54.9 pence	66.7 pence
Minimum weekly cost of family food	11s. 7d.	14s. 0¾d.

*Diet No. 14.—Man, Wife, and Three Children, 1 to 2 Years,
2 to 3 Years, and 3 to 6 Years : Man-value 3.03*

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef... ..	1½ lb.	s. d. 9	s. d. 9	127.9	125.2	—	1,689
Mutton	½ lb.	2½	3	25.2	84.6	—	890
Minced meat ...	2 lb.	10	10	170.6	167.0	—	2,252
Bacon	1 lb.	6	5	46.7	245.8	—	2,478
Corned beef ...	½ lb.	3	3	59.6	42.4	—	639
Cheese	2 lb.	1 1	1 0	233.2	317.6	28.2	4,022
Milk... ..	24½ pts.	5 7¼	5 7¼	458.1	499.8	666.4	9,261
Kipper	1 lb.	5	4	64.0	50.4	—	730
Butter	½ lb.	5	4¾	0.4	188.2	—	1,751
Lard (dripping)... ..	½ lb.	3	2½	—	226.8	—	2,109
Flour <i>or</i>	17½ lb.	—	1 8	801.5	127.8	5,993.8	29,050
Bread	28 lb.	4 1	—	(915.6)	(25.2)	(6,109.6)	(29,036)
Sugar	5¼ lb.	1 1	1 1	—	—	2,381.4	9,765
Jam	1 lb.	4½	4	1.4	—	314.8	1,296
Potatoes	7 lb.	5	3	60.2	0.7	574.7	2,611
Yeast	¼ lb.	—	2	—	—	—	—
Tea	½ lb.	6	5	—	—	—	—
Oatmeal (med.) ...	½ lb.	1¼	1	27.0	19.5	158.7	943
Rice... ..	½ lb.	1¼	1	13.4	0.9	182.1	810
Treacle	½ lb.	2¼	2	3.6	—	135.8	572
Barley	½ lb.	1	1	15.8	1.8	181.2	825
Fresh fruit and green vegetables	—	2 0½	2 0½	—	—	—	500
Total weekly quantities	—	19 3½	16 5	2,108.6	2,098.5	10,617.1	72,193
Daily quantities per man	—	—	—	99.4	98.9	509.6	3,404

Total first-class protein, 1,185.7 grams.

Daily first-class protein per man, 55.9 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	65 pence	76.4 pence
Minimum weekly cost of family food	16s. 5d.	19s. 3½d.

*Diet No. 15.—Man, Wife, and Three Children, 1 to 2 Years,
6 to 8 Years, and 8 to 10 Years: Man-value 3.43*

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	2½ lb.	s. d. 1 3	s. d. 1 3	213.2	208.7	—	2,815
Mutton	1 lb.	5	6	50.4	169.2	—	1,780
Minced meat ...	1 lb.	5	5	85.3	83.5	—	1,126
Bacon	1 lb.	6	5	46.7	245.8	—	2,478
Corned beef ...	1 lb.	6	6	119.3	84.8	—	1,278
Cheese	3 lb.	1 7½	1 6	349.8	476.4	42.3	6,033
Milk	17½ pts.	4 0	4 0	327.2	357.0	476.0	6,615
Kipper	1¼ lb.	6½	5	80.0	63.0	—	913
Butter	½ lb.	5	4¾	0.4	188.2	—	1,751
Lard (dripping) ...	½ lb.	3	2½	—	226.8	—	2,109
Margarine	½ lb.	3	2	0.4	192.3	—	1,789
Flour or	21 lb.	—	2 0	959.7	153.3	7,192.5	34,860
Bread	33¾ lb.	4 11	—	(1,103.6)	(30.4)	(7,364.3)	(34,999)
Sugar	4¾ lb.	10¾	10½	—	—	2,154.6	8,835
Jam	1 lb.	4½	4	1.4	—	314.8	1,296
Potatoes	7 lb.	5	3	60.2	0.7	574.7	2,611
Yeast	¼ lb.	—	2	—	—	—	—
Tea	½ lb.	6	5	—	—	—	—
Oatmeal (med.) ...	½ lb.	1¼	1	27.0	19.5	158.7	943
Rice	1 lb.	2½	2	26.8	1.8	364.2	1,620
Treacle	½ lb.	2¼	2	3.6	—	135.8	572
Beans	½ lb.	1	1	42.2	1.6	141.0	766
Barley	½ lb.	1	1	15.8	1.8	181.2	825
Fresh fruit and green vegetables	—	2 0½	2 0½	—	—	—	500
Total weekly quantities	—	20 0¼	16 5¼	2,409.4	2,474.4	11,735.8	81,515
Daily quantities per man	—	—	—	100.3	103.1	488.8	3,395

Total first-class protein, 1,272.3 grams.

Daily first-class protein per man, 53 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	57.5 pence	70 pence.
Minimum weekly cost of family food	16s 5¼d.	20s. 0¼d.

*Diet No. 16.—Man, Wife, and Three Children, aged 6 to 8 Years,
10 to 12 Years, and 12 to 14 Years: Man-value 4.13*

Item	Quantity	Price B.M.A. Mean	Price Stockton Mean	Protein (grams)	Fat (grams)	Carbo- hydrate (grams)	Calories
Beef	3 lb.	s. d. 1 6	s. d. 1 6	255.9	250.5	—	3,378
Mutton	2 lb.	10	1 0	100.8	338.4	—	3,560
Minced meat	1 lb.	5	5	85.3	83.5	—	1,126
Bacon	1 lb.	6	5	46.7	245.8	—	2,478
Corned beef	2 lb.	1 0	1 0	238.4	169.6	—	2,556
Cheese	3 lb.	1 7½	1 6	349.8	476.4	42.3	6,033
Milk	14 pts.	3 2½	3 2½	261.8	285.6	380.8	5,292
Kipper	1¼ lb.	6½	5	80.0	63.0	—	913
Butter	½ lb.	5	4¾	0.4	188.2	—	1,751
Suet	¼ lb.	1½	1½	1.3	105.8	—	989
Lard (dripping)	½ lb.	3	2½	—	226.8	—	2,109
Margarine	½ lb.	2	2	0.4	192.3	—	1,789
Flour or	24½ lb.	—	2 3½	1,122.1	178.8	8,391.2	40,670
Bread	39½ lb.	5 8¾	—	(1,283.5)	(35.3)	(8,564.4)	(40,702)
Sugar	6½ lb.	1 2¾	1 2¼	—	—	2,948.4	12,090
Jam	1 lb.	4½	4	1.4	—	314.8	1,296
Potatoes	10½ lb.	7½	4½	90.3	1.1	862.1	3,917
Peas (split)	1 lb.	1½	1	92.1	3.2	285.8	1,579
Yeast	¼ lb.	—	2	—	—	—	—
Tea	½ lb.	6	5	—	—	—	—
Oatmeal (med.)	½ lb.	1¼	1	27.0	19.5	158.7	943
Rice	1 lb.	2½	2	26.8	1.8	364.2	1,620
Treacle	¾ lb.	2¼	3	5.5	—	203.8	858
Beans (butter)	½ lb.	1½	1	42.2	1.6	141.0	766
Barley	1 lb.	2	1¾	31.7	3.6	362.4	1,650
Fresh fruit and green vegetables	—	2 6	2 6	—	—	—	500
Total weekly quantities	—	22 6½	18 5¼	2,859.9	2,835.5	14,455.5	97,863
Daily quantities per man	—	—	—	98.9	98.1	500.0	3,385

Total first-class protein, 1,420.4 grams.

Daily first-class protein per man, 49.1 grams.

	Stockton Mean	B.M.A. Mean
Cost of food per man per week ...	53.6 pence	65.5 pence
Minimum weekly cost of family food	18s. 5¼d.	22s. 6½d.

Notes.—Diets Nos. 9, 10, 11, 12 and 13

Diets numbered 9 to 13 show budgets for families consisting of man, wife, and one child. In each successive diet the age of the child has been increased. The guiding rule of 1 pint of milk per day for a child up to the age of 5 has been observed, and of half a pint of milk from 5 years to 10. Each adult has been allowed a quarter of a pint of milk per day. In the case of children up to the age of 3 the protein allowed has been first-class protein in the proportion to second-class protein as set out on page 28.

Notes.—Diets Nos. 14, 15, and 16

Diets Nos. 14, 15, and 16 have been constructed to meet the requirements of a family consisting of man, wife, and three children of various ages. It will be noted that the total cost of each diet is somewhat below the sum of individual diets for each member of the family. The reduction amounts to approximately 10 per cent.

CONCLUSIONS AND RECOMMENDATIONS

In attempting to fulfil the terms of reference "*To determine the minimum weekly expenditure on food-stuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets,*" the Committee has endeavoured to formulate a workable interpretation of available data, proved experience, and the recommendations of authorities in regard to the quantitative and qualitative food requirements of children and adults.

It has long been recognized that it is necessary for purposes of comparison and for bulk estimation of food and rations to adopt some standard unit food requirement, such as the number of food calories and quantities of protein, fat, and carbohydrate sufficient to supply the needs of a normal man of average stature, performing moderate muscular work. The Committee, after careful consideration, recommends the adoption of the figure 3,400 calories *in the food as purchased* as the unit requirement of the normal man of average stature, if health and working capacity are to be maintained.

This is not a minimum figure, nor would the adoption of a bare subsistence standard fulfil the terms of reference of the Committee, which specifically state that both *health and working capacity* are to be maintained. It, moreover, does allow a little latitude for individual variation. The figure 3,400 calories, made up from 100 grams protein (50 grams of which should be first-class protein), 100 grams fat (of animal origin as far as possible), and 500 grams carbohydrate, takes into account the unavoidable waste in preparation and losses in digestion. The individual and family dietaries which have been compiled are based on this standard man-value requirement, and foods have been selected to give the required balance, variety, palatability, and roughage, and to ensure that adequate supplies of mineral salts and vitamins are present. Stress is laid on the adequate provision of milk for children, and on the invariable inclusion of dairy produce, fruits, and green vegetables in the family diet in order to ensure a sufficiency of foodstuffs containing vitamins and mineral constituents.

In regard to the minimum expenditure necessary to enable food to be purchased according to the recommended standard and the dietaries specified in the report, the Committee has been fortunate in being able to study and compare the cost of these foodstuffs as purchased by working-class families in a locality (Stockton-on-Tees) where the prices are particularly low, and the cost of similar commodities in various parts of England as ascertained for it by medical officers of health.

Owing to local variations in prices it would be of little use to specify a single basic figure for the cost of food per man-value, for the application of such a figure would be strictly limited. It appears to the Committee, however, that a useful purpose may be served by giving figures for the cost of the various individual and family dietaries when the foodstuffs are purchased in one of the cheapest markets, and the cost for the same foodstuffs as calculated from the means of the prices ruling in various parts of the country. In the specimen diets which have been prepared in accordance with the terms of reference of the Committee both prices are shown, and figures are given

for the cost of food per man-value per week on the basis of 3,400 calories per day in the food as purchased. To quote from the report:

“ Each dietary indicates this range of cost—namely, the cost per man-value per week on the Stockton price scale, and the cost as based on the mean figures furnished by medical officers of health. For example, dietary No. 14 for man, wife, and three children can be purchased at Stockton prices at a cost of 5s. 5d. per man-value per week, while on the B.M.A. mean scale the cost would be 6s. 4½d. Moreover, intermediate or even higher figures might apply to certain localities, for, as previously stated, the scales adopted show average, not universal, prices.”

The food necessary and suitable for young children is relatively more costly per unit of energy than the food required by older children and adults, and therefore the cost of food per man-value per week is higher in families possessing a number of young children aged 1 to 6 than for families of the same equivalent man-value in which older children predominate. The higher cost of calories in children's diets, as compared with the same number of calories for an adult, makes the calorie scale of family coefficients unreliable as a basis on which to calculate the minimum cost of adequate food for families containing young children. The Committee has therefore examined the relative cost of children's and adult dietaries, and constructed a cost scale of family coefficients which is generally applicable, provided the basic cost of food per man-value is first ascertained. By means of this scale it is possible to work out the scale of costs corresponding to the need for calories at varying ages, and this has been done for the mean prices in the cheap market of Stockton and for the B.M.A. mean price scale.

In conclusion, the Committee desires to emphasize the fact that until the calorie scale of family coefficients and the cost scale of family coefficients are firmly established by inquiries directed specifically towards that end, it will not be possible to deal with the problem presented to it with greater precision.

Moreover, it wishes to express its earnest hope that the dietaries forming part of this report will not be regarded as of simply ephemeral value, for by ascribing the local price for the quantities of foodstuffs

purchased at any time it will be easily possible to calculate the current minimum cost of food per man-value per week which in the opinion of the Committee is adequate to ensure the health of the family and the working capacity of the average breadwinner.

Family Coefficients. Man-value Calorie and Cost Coefficient Scale

	Man-value Calorie Coefficients	Cost per head per week (to nearest ld.)		Mean Cost Coefficients
		B.M.A. Scale	Stockton Scale	
Adult male	1.00	s. d. 5 11	s. d. 5 0	1.00
Boy over 14 years	1.00	5 11	5 0	1 00
Adult female	0.83	4 11	4 2	0.83
Girl over 14 years	0.83	4 11	4 2	0.83
Child 12 and under 14 years	0.90	5 4	4 6	0.90
" 10 " 12 "	0.80	4 9	4 0	0.80
" 8 " 10 "	0.70	4 2	3 7	0.71
" 6 " 8 "	0.60	3 7	3 0	0.60
" 3 " 6 "	0.50	3 5	3 0	0.59
" 2 " 3 "	0.40	3 1	2 10	0.54
" 1 " 2 "	0.30	2 8	2 6	0.47

Notes

1. The lower prices on the Stockton scale are mainly due to the lower cost of flour as compared with bread, but it must be borne in mind that the cost of fuel is not included in the Stockton prices.

2. From the age of 10 upwards the calorie coefficients and cost coefficients are identical, because the individual requirements of food are simple fractions of the basic diet per man unit. In the case of children below the age of 10 different qualitative requirements raise the cost scale above the calorie scale.

3. At any time, by substituting local and current prices for those in the dietaries published in the body of the report, the cost of adequate food per man unit or per child can easily be calculated and the cost scale for the locality worked out.

APPENDIX A

Table of Food Values. Analysis and Energy Value of Edible Portion Taken from Tables. (By R. H. A. Plimmer, D.Sc.)

Per lb.	Protein (grams)	Fat (grams)	Carbohydrate (grams)	Calories
Beef, forequarter	85.3	83.5	—	1,126
Beef, hindquarter	75.3	135.6	—	1,570
Mutton	50.4	169.2	—	1,780
Beef, corned (Glasgow analysis)	119.3	84.8	—	1,278
Liver, ox	90.3	14.5	20.0	587
Sausage, beef	50.8	80.3	68.9	1,238
Suet, beef	5.4	423.2	—	3,953
Dripping, or lard	—	453.5	—	4,219
Fish, cod	66.2	0.4	—	276
Fish, herring, fresh	66.2	39.9	—	643
Fish, herring, kipper	64.0	50.4	—	730
Fish, herring, salted	100.7	57.2	—	944
Fish, haddock, fresh	54.4	0.9	—	232
Fish, haddock, smoked	67.6	0.9	—	286
Fish, ling	61.7	1.8	—	270
Fish, mackerel	49.9	28.1	—	466
Bread, white	32.7	0.9	218.2	1,037
Bread, brown	31.8	1.8	216.4	1,012
Flour	45.8	7.3	342.5	1,660
Milk (pint)	18.7	20.4	27.2	378
Eggs	50.3	45.8	6.3	659
Bacon streaky	46.7	245.8	—	2,478
Bacon shoulder	35.8	261.3	—	2,577
Cheese, hard, full milk	116.6	158.8	14.1	2,011
Cheese, skim	146.1	52.6	42.6	1,260
Butter	0.9	376.5	—	3,503
Margarine	0.9	384.7	—	3,579
Sugar, white	—	—	453.6	1,860
Jam	1.4	—	314.8	1,296
Treacle	7.3	—	271.7	1,144
Syrup, golden	1.4	—	346.6	1,427
Cocoa	82.1	121.6	182.8	2,215
Currants, dried	7.7	1.4	190.5	826
Prunes	11.3	0.9	153.8	685

Appendix A (continued)

Per lb.	Protein (grams)	Fat (grams)	Carbohydrate (grams)	Calories
Dates	6.3	0.4	268.5	1,131
Rice, polished	26.8	1.8	364.2	1,620
Oatmeal, medium	54.0	39.0	317.5	1,886
Oats, rolled	59.4	29.5	315.2	1,809
Barley, pot	31.7	3.6	362.4	1,650
Beans haricot	80.7	2.3	292.6	1,552
Beans, butter	84.4	3.2	282.1	1,532
Peas, whole green, dried ...	92.5	2.7	259.0	1,467
Peas split, yellow	92.1	3.2	285.8	1,579
Lentils, split, red	91.2	1.8	289.8	1,579
Potatoes old	8.6	0.1	82.1	373
Potatoes, new	7.3	0.1	92.5	410
Cabbage	3.2	0.2	17.7	88
Carrot	5.4	0.4	43.6	205
Turnip	5.4	0.4	20.0	108
Tomato	3.2	0.4	20.4	101
Watercress	5.9	1.4	13.6	93
Lettuce	3.2	0.6	5.4	41
Apples	1.3	0.9	44.4	196
Lemons	0.9	0.9	4.5	31
Oranges	2.7	0.4	29.9	137

APPENDIX B

The following list of common foodstuffs indicates the distribution of the vitamins.

Vitamin A.—Fish oils and fats, butter, egg-yolk, milk, cheese, and liver contain considerable amounts of vitamin A. Green vegetables and certain root vegetables such as carrots are less prolific sources of this vitamin, but do contain valuable amounts.

Vitamin B Group.—Whole cereals, beans, peas, lentils, root and green vegetables, fruits, nuts, milk, cheese, egg-yolk, and offal meat such as liver and kidney.

Vitamin C.—Fresh fruits and green vegetables, and potatoes, carrots, etc.

Vitamin D.—Fish oils and fats, egg-yolk, milk, butter, and liver.

Cod-liver oil is a very potent source of vitamins A and D.

APPENDIX C

Means of Prices, in Pence per lb., Collected by the B.M.A. from Various Districts, in June, 1933, and the June Prices of the Ministry of Labour, also the Prices for Twelve Months in Stockton-on-Tees for the Period August, 1932, to July, 1933

	Mean B.M.A.	Ministry of Labour, June, 1933	Stockton Mean, August, 1932, to July, 1933
Beef:			
Ribs, British	10.5	14.0	9.2
Flank	5.5	7.5	4.0
Ribs, imported	7.4	8.7	7.3
Flank, imported... ..	3.3	4.5	3.5
Mutton:			
Shoulder, British	9.1	—	9.0
Leg	10.6	14.7	10.0
Breast	4.7	7.5	4.2
Shoulder, imported	5.7	—	7.0
Leg	7.9	9.2	8.0
Breast	2.7	3.7	3.7
Sausage, pork	11.8	—	11.0
Sausage, beef	6.0	—	6.0
Minced meat	6.1	—	5.0
Dripping	5.3	—	5.0
Suet	5.8	—	6.0
Lard	6.0	—	5.0
Fish	4.8	—	5.0
Bread, 2 lb.	3.5	3.6	4.0
Flour, 14 lb.	22.2	24.0	15.5
Milk (pint)	2.5	2.7	2.7
Eggs, fresh	1.1	1.2	1.5
Eggs, cooking	0.8	—	1.0
Bacon, streaky	6.0	11.2	5.5
Cheese, Empire	6.2	—	6.0
Cheese, American... ..	7.4	9.0	7.0
Butter, fresh... ..	12.0	13.2	13.5
Butter, Danish	11.2	11.5	11.0
Butter, Empire	10.0	—	9.5
Margarine	4.1	6.0	4.0
Sugar	2.25	2.2	2.2
Jam, 2 lb.	8.6	—	8.0

Appendix C (continued)

	Mean B.M.A.	Ministry of Labour, June, 1933	Stockton Mean, August, 1932, to July, 1933
Treacle	4.3	—	4.0
Syrup	4.5	—	4.5
Currants	5.8	—	5.2
Prunes... ..	6.0	—	5.0
Dates	3.3	—	3.0
Rice	2.4	—	2.0
Oatmeal	2.5	—	2.0
Oats	2.6	—	2.5
Barley	2.1	—	1.7
Beans, haricot	2.0	—	2.0
Beans, butter	3.2	—	2.5
Tea	12.9	21.5	—
Peas	3.4	—	2.0
Lentils... ..	2.9	—	1.7
Potatoes, 14 lb.	10.3	15.0	6.0
Cabbage	1.2	—	0.5
Carrots... ..	1.0	—	0.8
Turnips	1.0	—	0.8
Tomatoes	7.9	—	7.0

The "Mean B.M.A." prices were calculated from prices obtained in Bootle, Cardiff, Heston and Isleworth, Newcastle-on-Tyne, Oxfordshire, Oxford City, and Swindon.

Cost of Foodstuffs

The Ministry of Labour publishes monthly the retail prices of twenty articles of food in common use. These figures are used in the calculation of the cost of living index. It might be thought that the sum of the cost of unit quantity of these twenty foods would serve as a guide to the minimum cost of a family budget, but in practice certain difficulties arise. These difficulties are as follows:

The twenty articles quoted do not cover the full range of foodstuffs commonly purchased by housewives.

Some of the twenty items are not usually purchased by the poorer sections of the community, whilst others are habitually purchased at a cheaper rate. Thus British beef (Nos. 1 and 2 in the list in Appendix C) is rarely bought on account of high cost. The same reason applies to abstention from British mutton (Nos. 5 and 6).

Bacon is usually purchased at a figure considerably below that of the official list. This applies not only to Stockton-on-Tees, but to all areas from which the Committee has received special information.

The Ministry of Labour gives 2s. per stone as the average price of flour. This figure appears to be high, for in Stockton-on-Tees the prices range from 1s. 3d. to 1s. 10d., and in other areas the price range is much the same. London appears to be an exception to this statement, for the quotations furnished to the Committee range from 2s. 4d. to 2s. 6d. On the other hand, bread in London can be purchased 1d. per 4-lb. loaf cheaper than in the provinces.

Tea presents a big difficulty in the Ministry of Labour figures, for the average price for twelve months as quoted in the *Ministry of Labour Gazette* is 1s. 9½d. Families with small incomes obtain tea at a much lower figure than 1s. 9½d. The variations usually purchased range from 10d. to 1s. 4d. per pound.

GLOSSARY

It is hoped that the report of the Nutrition Committee will be studied by a wide public. It is realized that not all the potential readers of the report are familiar with the technical terms in common use in nutritional studies. It has been decided, therefore, to include a short glossary of those terms which may present some difficulty.

Calorie.—The measure of the energy units or heat-producing constituents of a diet (see definition, pp. 6-7).

Protein.—Nitrogenous foodstuffs necessary for growth and the repair of tissues.

Protein, first-class.—Protein derived from animal sources—for example, meat, fish, egg-yolk, milk, and cheese. Animal protein is of higher nutritional or biological value than vegetable protein, and is more completely utilized in the body.

Protein, second-class.—Protein derived from vegetable sources—for example, peas, beans, potatoes, carrot, etc. Protein of this type cannot entirely replace animal (first-class) protein.

Each gram of protein yields 4.1 calories.

Fat.—The term is self-explanatory, but animal fat (except lard) is of more value in a diet than vegetable fat such as olive oil, for it usually contains vitamins A and D, which are absent from vegetable fats and oils. It is for this reason, among others, that butter is of much greater value as a food than is margarine. Each gram of fat yields 9.3 calories.

Carbohydrate.—Starches and sugars are the carbohydrates commonly present in foods. They are useful as sources of energy, but their vitamin and mineral content is low or absent. Each gram of carbohydrate yields 4.1 calories.

Vitamins.—Factors present in certain foods in minute quantities which are essential for growth and the maintenance of health.

Vitamin A.—Necessary for growth and for the maintenance of resistance to infection.

Vitamin B.—One of the factors upon which normal growth is dependent. Vitamin B is not a simple substance, but consists of a group of vitamins which are necessary for the maintenance of health.

Vitamin C.—The anti-scurvy vitamin.

Vitamin D.—The anti-rickets vitamin.

(See Appendix B for a list of the principal foodstuffs which contain vitamins.)

Minerals.—Calcium, phosphorus, iron, chlorine, copper, and numerous other minerals are necessary for the normal growth and functioning of the body. Most of these minerals can only be absorbed by the body in the form in which they occur naturally in foods. It is, for instance, useless to give lime-water to a child in the hope of increasing the lime salts of the body in cases of rickets. Some of the minerals can only be absorbed in the presence of certain vitamins.

Man-value.—In nutritional studies the food needs of the adult male are taken as the measure of unity. A woman or a child requires only a certain fraction of the amount of food necessary for an adult male. This fraction is known as the "man-value." Thus a child of 6 to 8 years of age requires six-tenths of the calories of an adult male, and its man-value is said to be 0.6.

